Report on the 35th International Symposium on the Remote Sensing of the Environment (35th ISRSE) held in Beijing, China from 22-26 April 2013

The 35th ISRSE was organized by staff from what was CEODE (Center of Earth Observation and Digital Earth, Chinese Academy of Sciences), but has recently been renamed The Institute of Remote Sensing and Digital Earth (RADI), (Chinese Academy of Sciences (CAS)), which was launched during a special session at the start of the Symposium. RADI was formed through the merging of two CAS institutes: the Institute of Remote Sensing Applications (IRSA) and the Center for Earth Observation and Digital Earth (CEODE). More than 650 people attended the Symposium, which is slightly more than the number who attended the Symposium in Sydney in 2011, but on this occasion, there were virtually no people from USA because of the US government's 'sequestration'. More than 1200 abstracts were received from 56 countries; 346 oral papers were presented in 63 parallel sessions and 376 posters were also presented. Given that there were up to 7 parallel sessions, this report will concentrate on the speakers at the Plenary Sessions held each morning of the symposium.

Plenary 1 – International Space Agency Programmes

As usual there were reports from the major space agencies around the world, although the attendance was limited with no representatives from USA, India or Japan.

Stephen Briggs (ESA) referred to the satellite GOCE which measures gravity to an accuracy of 1 in 1012, giving the best gravity field measurement for determining the geoid. Also combined with sea surface altimetry the sea surface topography can be obtained revealing the dynamic topography of the sea. SMOS will measure soil moisture and salinity for the first time. Sea wind speed and sea ice thickness (for Arctic) will be determined with Cryosat. SWARM will make magnetic field measurements with 2 satellites. GMES is now named 'Copernicus' which is part of GEOSS. Sentinels 1 - 5 will be launched from 2013 to 2020. GMES services data policy is generally free availability, but this is to be determined by EU commission. 5 PBytes of data will be available per year. A minimum of 3 meteorological satellites each year are operated by EUMETSAT.

Gunter Shreier (German Space Agency – DLR) spoke of the TerraSAR and TandemX which enable production of a global DEM; it will take 2 to 3 years processing. PSInSAR is being used for movement of structures from eg ground water extraction. TerraSAR positional accuracy is 0.1 m, hence measurement of movement of ice in the oceans is possible. There is massive volume of data available and the question is how to deal with it? Big data from space! A possible solution is to use software on remote systems, ie leave data on the platform where archives are located.

Douglas Bancroft (Canadian Centre for Remote Sensing – CCRS) spoke on the C-band SAR developments in Canada. Radarsat-1 is dead, so a new Radarsat is being built. CCRS are in the business of public good. Good problem definition is needed to influence policy on availability of data. He presented example of detection of oil spills in the oceans, which changed the behaviour of the ship operators, the monitoring of oil sands and policy development for the use of earth observation for monitoring water availability for shale gas extraction and pipeline integrity. EnMap is first proposed hyperspectral satellite by Canada.

Anond Snidvongs (Thailand Earth Observation System Phase 2 (THEOS-2) spoke of Thailand's plans beyond their ThEOS-1 and their new remote sensing processing facility.

Plenary 2 – Earth observation for Climate Change amd Global Environmental Monitoring

Simon Eggleston (Global Forest Observation Initiative – GFOI) described the work being undertaken by 13 space agencies and endorsed by 90 countries for GFOI. 17% of Greenhouse Gas (GHG) emissions are from forest degradation. REDD+ is a natural forest monitoring system (NFMS) requiring both data and support services. GOFC-GOLD is another organisation involved in forest monitoring, but is said to be more academic. Australia/Indonesia IFCI is a contribution.

Xiaohan Liao (China) NRSCC – MOST Ministry and S&T, described earth observation satellites for environmental monitoring by China. 19 ministries involved in earth observation technologies; there are 49 branches of NRSCC involved in remote sensing. Data sets and report online at www.csi.gov.cn

Ghassem Asrar from World Climate Research Program spoke on monitoring, understanding and prediction the Earth system. There is an agreement between countries to determine what is needed for environmental monitoring. The knowledge is available. More work is needed to describe weather and predict future events. Countries need to join forces on climate and weather knowledge deficits, eg North Atlantic Oscillation (NAO) – Global Framework for Climate Services (GFCS). Predictability of weather up to a decade may be possible in the future.

Wengjian Zhang (WMO) stated that the architecture for Climate Monitoring is inadequate; a report is available on gap analysis. Priorities are on agriculture, water, health, disaster response, emissions monitoring. There is a need to improve the synergy between in situ and satellite observations.

An afternoon session on GOFI, REDD and REDD+ provided additional information. The aim is to collect consistent time series data for all countries. Long term free data is needed with resolution <30 m based on Landsat 8, CBERS 3 (2013) and CBERS4 (2014), Sentinel 2A and 2B, plus SAR satellites in the near future. Operation aspects were described involving pixel based determinations. Methods and Guidance Document (MGD) is being prepared (see below) which should be available by June 2013. R&D is being undertaken on degradation maps, peat beds, mangroves, plantations, uncertainty and accuracy; soil moisture, below ground and above ground biomass.

The Methods and Guidance Document (MGD) was presented by Miriam Baltuck from ACT who is partly responsible for its preparation. $millions are being invested in REDD+. Aims are to establish a benchmark for organizations to aim for and improve on. Doug Machoney (USGS) described the considerable work being done on capacity building, including Australia working with Indonesia.

Plenary 3 – Roles of EO in Disaster Mitigation, Terrestrial Ecosystems and Land Dynamic Change

Stephan Lechner (JRC) Coherent Earth Observation: Copernicus System which involve study of water and hydrological models. Current measurements of soil moisture are very variable.

Li Deren (Wuhan University) described research for natural disaster reduction (CNDRSS) in China. Humans have now entered the 'Risk Society'. China has 4 optical and 4 SAR satellites covering the country every day. High spatial and high spectral resolution are available as well as 20m in satellites in geostationary orbit. High spatial resolution is planned for mapping at 0.6 m GSD in panchromatic and 3.6 m GSD for MSS with forward, backward and nadir looking. Accuracy of images derived from the ZY3 satellite are about 10 m without GCPs and 2-3 m with GCPs. Data will be coordinated with ground measurements including UAV data, based on real time data transmission, and matching of details for users in a short time. By 2020 China will have 200 satellites, 20 for earth observation, including 16m, 700km swath which will be available to the public. He stated that China needs to improve data quality and welcomes cooperation with other countries.

Alex Held from CSIRO and TERN, described the extensive facilities available in Australia for research through TERN.

Plenary – 4 Remote Sensing Retrospective and Future Prospects

Peng Gao (esri USA) described the imagery market place from ESRI.

Steven Wilson CEO ICSU spoke on the Future Earth program of ICSU – www.futureearth.info.

Shunlin Liang (Beijing Normal University and University of Maryland) described environmental change detection using GLASS products data.

John van Genderen (ITC) – provided interesting examples of past technology used for remote sensing processing and research, this being the 50th celebration of ISRSE series of conferences. He also provided some perspectives for future developments.

At the closing ceremony on April 26 2013, Professor Gou Huadong, Chief of RADI and Chair of the Symposium announced that China had on that morning successfully launched its first high resolution earth observing satellite from the Jiuquan Satellite Launch Centre in northwest China's Gansu Province. Gaeofen-1 has a resolution of 2 m and will be used to support precision agriculture, predict natural disasters and improve natural resources surveying, environmental monitoring and public security.

The venue for the 36th ISRSE has not been finalised and will be announced in the future.

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